

Patent Claims

1. Satellite-based navigation method for the determination of the position of a receiver (1, 5) by ascertaining the signal propagation time between satellites (3, 4, 7, 8, 9) and the receiver (1, 5), **characterized in that** the reception time of satellite signals at the receiver is ascertained by means of a precise time reference in the receiver (1, 5) as well as also from the satellite signals and [both are] compared with one another.
2. Satellite-based navigation method for the determination of the position of a receiver (1, 5) by ascertaining the signal propagation time between satellites (3, 4, 7, 8, 9) and the receiver (1, 5), **characterized in that** at least two position solutions are determined from the reception time, ascertained by means of a precise time reference of the receiver (1, 5), of the satellite signals at the receiver (1, 5) and at least one satellite signal each from different satellites is determined, and compared with one another.
3. Satellite-based navigation method as claimed in claim 2, **characterized in that** the reception time of the satellite signals at the receiver (1, 5) is ascertained by means of a precise time reference in the receiver (1, 5) as well as also from the satellite signals and compared with one another.
4. Satellite-based navigation method as claimed in one of the preceding claims, **characterized in that** the satellite signals are only drawn on for the position determination if the difference between the reception time, ascertained from the satellite signals and from the time reference, and/or the difference between two position solutions, determined from satellite signals, does not exceed a particular specifiable tolerance value.

5. Satellite-based navigation method as claimed in one of the preceding claims, **characterized in that** a position interval is determined if the difference between the reception time ascertained from the satellite signals and that from the time reference and/or the difference between two position solutions determined from satellite signals exceeds a particular specifiable tolerance value.

6. Satellite-based navigation method as claimed in one of the preceding claims, in particular for a track-guided receiver (1), **characterized in that** satellite signals from two satellites (3, 4) are evaluated, whose position is determined by a first angle ϑ_1 between the direction of movement of the receiver (3) and the connection direction from the receiver (1) to a first satellite (3) in an angular range of $0^\circ < \vartheta_1 < 90^\circ$ and by a second angle ϑ_2 between the direction of movement of the receiver (1) and the connection direction from the receiver (1) to a second satellite (4) in an angular range of $90^\circ < \vartheta_2 < 180^\circ$.

7. Satellite-based navigation method as claimed in claim 6, **characterized in that** for the determination of the reception time from the satellite signals of a first and a second satellite (3, 4), the position and the time offset error of a pseudo-range measurement is ascertained.

8. Satellite-based navigation method as claimed in one of the preceding claims, in particular for a surface-bound receiver (5), **characterized in that** satellite signals are evaluated from three satellites (7, 8, 9) whose positions are determined by a first angle φ_1 for the first satellite (7), a second angle φ_2 for the second satellite (8) and a third angle φ_3 for the third satellite (9), the angles $\varphi_1, \varphi_2, \varphi_3$ being the azimuth angles of the connection directions, projected onto the base plane (10) of a system of coordinates, from receiver (5) to the particular satellites (7, 8, 9) and are related to one another: $0^\circ < \varphi_2 - \varphi_1 < 180^\circ$ and $0^\circ < \varphi_3 - \varphi_2 < 180^\circ$ and $360^\circ > \varphi_3 - \varphi_1 > 180^\circ$.

9. Satellite-based navigation method as claimed in claim 8, **characterized in that** the base plane (10) of the system of coordinates lies in a plane which at the position of the receiver (5) is tangential to a surface (6) on which moves the receiver (5).
10. Satellite-based navigation method as claimed in claim 8 or 9, **characterized in that** for the determination of the reception time the position and the time offset error of a pseudo-range measurement is ascertained from the satellite signals of a first, second and third satellite (7, 8, 9).
11. Satellite-based navigation method as claimed in one of the preceding claims, **characterized in that** for increasing the integrity of the position solution a satellite-based integrity system is utilized.
12. Satellite-based navigation method as claimed in one of the preceding claims, **characterized in that** for increasing the accuracy and integrity of the position solutions a differential operation is provided.